

## CLAIMS

What is claimed:

1. An improved apparatus for forming a butt joint to join together the leading end of a web from a new roll of material to the trailing end of a web from an expiring roll of material for use with lightweight web materials, the web of the expiring roll being run downstream from the expiring roll under tension along a predetermined path of travel, the improved apparatus comprising:
  - a. means for securing at least a portion of the web from the new roll of material against an anvil, the anvil comprising a first side, a second side, and a cutting edge, the first side and second side being disposed adjacent to the path of travel of the new roll of material and the expiring roll of material;
  - b. means for traversing at least one shear wheel assembly across at least a portion of the secured new roll of material, the at least one shear wheel assembly comprising at least one shear wheel;
  - c. means for positively driving the at least one shear wheel, at least a portion of the at least one shear wheel comprised of at least one rotary cutter, the at least one rotary cutter being operably positioned so that the leading edge of the new roll of material is trimmed along the cutting edge of the anvil by the rotary cutter;
  - d. means for adhering a first piece of tape to at least a portion of the new roll of material, the adhered first piece of tape extending beyond the trimmed leading edge;

- e. means for securing at least a portion of the web of the expiring roll against the anvil;
  - f. means for traversing at least one shear wheel assembly across at least a portion of the secured web of the expiring roll of material;
  - g. means for positively driving at least one shear wheel across at least a portion of the secured expiring roll of material, the at least one shear wheel comprising a cutter configured so that the trailing end of the expiring roll of web material is cut along the cutting edge of the anvil by the rotary cutter;
  - h. means for adhering the trimmed trailing end of the expiring roll to the downstream portion of the first piece of tape, the cut portion of the trimmed trailing end substantially simultaneously being adhered to the first piece of tape as the point of cutting moves across the secured expiring roll, the first piece of adhesive tape securing together the leading end of the new roll and the trailing end of the expiring roll, the trimmed trailing end of the expiring roll adhered to the tape abuts and is disposed closely adjacent to the trimmed leading end of the new roll of material; and
  - i. means for releasing the new roll and the expiring roll from the anvil so as to permit the joined expiring and new roll to travel together along the path of further downstream portions of the web from the expiring roll.
2. The improved apparatus of claim 1 which includes means for momentarily stopping the web of the expiring roll of material adjacent to the anvil while at least a portion of the expiring web material downstream of the anvil continues to run under tension.

3. The improved apparatus of claim 1 which includes means for adhering a second piece of tape to the trimmed leading end of the new roll and the trimmed trailing end of the expiring roll on the side of the joined web opposite of that of the first piece of tape, the second piece of tape being adhered to the joined web after the joined web has commenced following the downstream portions of web from the expiring roll.

4. An improved apparatus for forming a butt joint to join together the leading end of a web from a new roll of material to the trailing end of a web from an expiring roll of material for use with lightweight web materials, the web of the expiring roll being run downstream from the expiring roll under tension along a predetermined path of travel, the improved apparatus comprising:

- a. a splicer frame that includes at least one side member and at least one end member, the at least one side member operably connected to the at least one end member;
- b. an anvil operably connected to the splicer frame, at least one side of the anvil being disposed adjacent to the path of travel of the web from the new roll and the web of the expiring roll, the anvil having a cutting edge;
- c. at least one shear wheel assembly operably connected to the splicer frame, the at least one shear wheel assembly comprising a shear wheel, the shear wheel having a rotary cutting edge, the at least one shear wheel adapted to move along the anvil, the shear wheel assembly configured for movement from the proximity of an adjacent at least one side member to the proximity of another at least one side member, the rotary cutting edge adapted for movement along a path substantially parallel to the cutting edge;

- d. at least one drive cable, at least a portion of the at least one drive cable being threaded through the splicer frame, at least a portion of the at least one drive cable threaded through the splicer frame being wrapped around at least a portion of the shear wheel; and
  - e. at least one cable terminator operably connected to the splicer frame, the at least one cable terminator configured to secure at least a portion of the at least one drive cable and to maintain tension on the at least one drive cable.
5. The apparatus of claim 4 wherein the at least one shear wheel assembly comprises a first shear wheel assembly and a second shear wheel assembly, the first shear wheel assembly being positioned adjacent a first side of the anvil, the second shear wheel assembly being positioned adjacent to a second side of the anvil.
6. The apparatus of claim 4 wherein the shear wheel includes a circumferential groove, the circumferential groove configured for engagement of at least a portion of the at least one drive cable.
7. The apparatus of claim 4 which includes a cable tensioning spring operably connected to the splicer frame, the cable tensioning spring configured to exert a tension force on the at least one drive cable.
8. The apparatus of claim 4 including a cable spool operably connected to the splicer frame, the cable spool including a plurality of excess drive cable operably connected to the at least one drive cable.
9. An improved apparatus for forming a butt joint to join together the leading end of a web from a new roll of material to the trailing end of a web from an expiring roll of material for use in lightweight web material and disposable diaper operations, the

web of the expiring roll being run downstream from the expiring roll under tension along a predetermined path of travel, the improved apparatus comprising:

- a. a splicer frame, the splicer frame having at least two side members and at least two end members;
- b. an anvil operably connected to the splicer frame, the plane of the anvil being generally perpendicular to the plane of the splicer frame, the anvil being disposed adjacent to the path of travel of the web from the new roll and the expiring roll, the anvil having a first side, a second side, and a cutting edge, the cutting edge having a width at least equal to the width of the web, the cutting edge being positioned downstream of the first side and the second side, the first side being substantially parallel to the second side;
- c. at least one drive cable, at least a portion of the at least one drive cable being threaded about the splicer frame to create a threaded drive cable, the threaded drive cable having a plurality of distal ends;
- d. at least one shear wheel assembly operably connected to the splicer frame, the at least one shear wheel assembly comprising a shear wheel, the shear wheel being biased for engagement with at least one side of the anvil, the shear wheel having a lower edge and a circumferential groove, the lower edge having a rotary cutting edge, the circumferential groove being configured to accept at least a portion of the at least one drive cable; and
- e. at least one cable terminator operably connected to the splicing frame, the at least one cable terminator configured to secure at least one of the

plurality of distal ends, the at least one cable terminator configured to maintain tension on the threaded drive cable.

10. The apparatus of claim 9 wherein the at least one shear wheel assembly comprises a first shear wheel assembly and a second shear wheel assembly, the first shear wheel assembly being positioned adjacent to the first side of the anvil, the second shear wheel assembly being positioned adjacent to the second side of the anvil.

11. The apparatus of claim 9 which includes a cable tensioning spring operably connected to the splicer frame, the cable tensioning spring configured to exert a tension force on the threaded drive cable.

12. The apparatus of claim 9 including a cable spool operably connected to the splicer frame, the cable spool including a plurality of excess drive cable operably connected to the threaded drive cable.

13. An improved method for forming a butt joint to join together the leading end of a web from a new roll of material to the trailing end of a web from an expiring roll of material for use in lightweight web material and disposable diaper operations, the web of the expiring roll being run downstream from the expiring roll under tension along a predetermined path of travel, the method comprising the steps of:

- a. threading a drive cable through a splicer frame and at least one shear wheel assembly, the at least one shear wheel assembly having a shear wheel, the shear wheel having a rotary cutting edge;
- b. wrapping at least a portion of the threaded drive cable around at least a portion of the shear wheel;

- c. tensioning the threaded drive cable to obtain tautness in the threaded drive cable;
- d. locking the threaded drive cable at two distal ends to maintain tautness of the threaded drive cable;
- e. securing a portion of web from the new roll against an anvil, the anvil including a cutting edge;
- f. moving the at least one shear wheel assembly from a first position to a second position, the movement of the at least one shear wheel assembly and the wrapping engagement between the shear wheel and the drive cable forcing the shear wheel to rotate;
- g. trimming a portion of the web from the new roll along the cutting edge of the anvil with the rotary cutter so that a trimmed leading end of the new roll is substantially congruent with the cutting edge of the anvil;
- h. applying a first piece of adhesive tape to the trimmed leading end so that a portion of the first piece of tape extends downstream beyond the cutting edge of the anvil and beyond the trimmed leading end;
- i. stopping a portion of the web from the expiring roll while maintaining tension in the web from the expiring roll located downstream of the stopped portion of the stopped web from the expiring roll;
- j. securing a portion of the stopped web from the expiring roll of material against the adjacent anvil;
- k. trimming the web from the expiring roll with the rotary cutting edge of the shear wheel along the cutting edge of the anvil so that a trimmed trailing

end of the expiring roll is aligned with and conforms to the cutting edge of the anvil;

- l. adhering the trimmed trailing end of the expiring roll to the downstream portion of the first piece of tape, the cut portion of the trimmed trailing end substantially simultaneously being adhered to the first piece of tape as the point of cutting moves across the secured expiring roll, the first piece of adhesive tape securing together the leading end of the new roll and the trailing end of the expiring roll, the trimmed trailing end of the expiring roll adhered to the tape abuts and is disposed closely adjacent to the trimmed leading end of the new roll of material; and
- m. releasing the new roll and the expiring roll from the anvil so as to permit the joined expiring and new roll to travel together along the path of further downstream portions of the web from the expiring roll.

14. The method of claim 13 including the further step of adhering a second piece of tape to the trimmed leading end of the new roll and the trimmed trailing end of the expiring roll on the side of the joined web opposite of that of the first piece of tape, the second piece of tape being adhered to the joined web after the joined web has commenced following the downstream portions of web from the expiring roll.